Building company

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About us

The Building Company "UBB buve Ltd." was founded in 2007 with the aim to provide wide-range services thus optimizing customer projects' final costs. Our main specialization is buildings monolith reinforced concrete structures construction as well as general contractor services.

At the moment we are working on mastering new technologies, such as "post-tensioning", and have already made two buildings with post-tensioned slabs (slab's total area 40 000m^2). We offer to carry out post-tensioned concrete structures design in collaboration with international partners, prepare the necessary project's technical documentation, realize the design in life, carry out the construction as well supervise the whole project.

All our specialists have appropriate education and constantly improve their knowledge mastering the most of today's new materials and technologies as well as studying new software and methods of structural design and construction.

Our competent certified specialists team successfully cooperate with acknowledged specialists in Europe thus obtaining unique experience and insight in tendencies of building development in the world. Carrying out the project our team successfully implement creative ideas of architects and improve them by engineering solutions.

Each project is a multiple-sided process – we are flexible to the desires and proposals of all its participants if they do not contradict with the safety of the solution. We react fast on the changes made in project and find adequate solutions, taking into account constructive and economical aspects. The work organization and quality control system, competent personnel, professional collaboration partners and high sense of responsibility about project – all allow us to keep within the agreed terms maintaining high quality of our work.

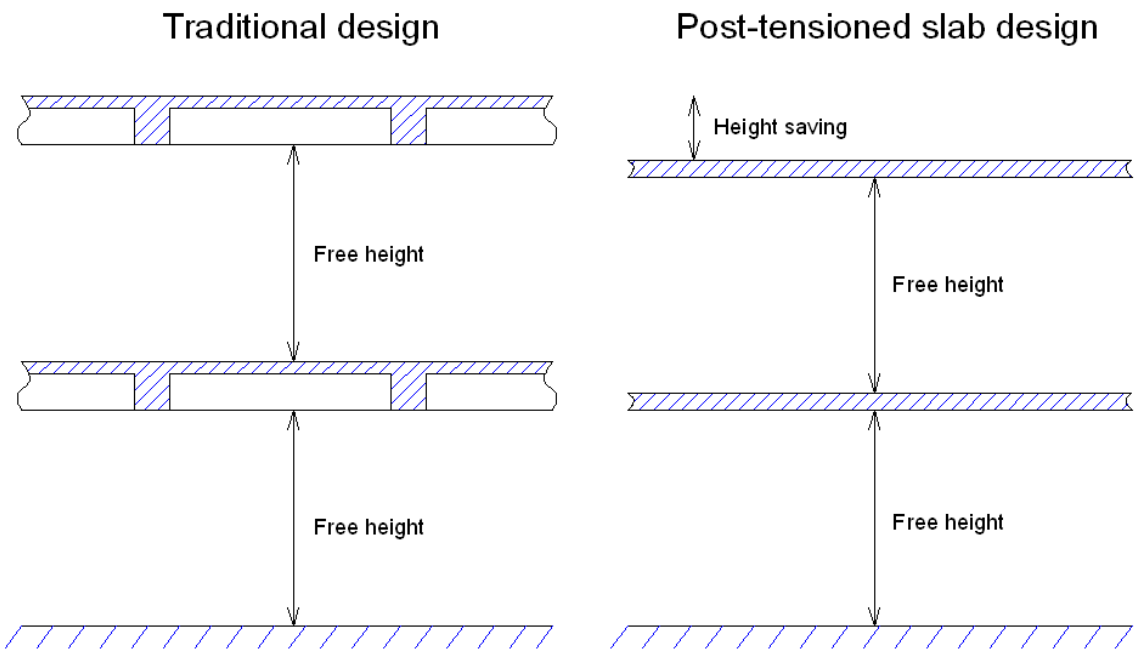
Post-tensioning technology

Advantages

Post-tensioned concrete technology is financially beneficial especially for long span (8m and more) concrete structures, because it is possible to reduce the costs, decreasing the amount of construction materials (concrete, reinforcement) usage (e. g. estimated amount of reinforcement for the slab is approximately 10-15kg/m^2).

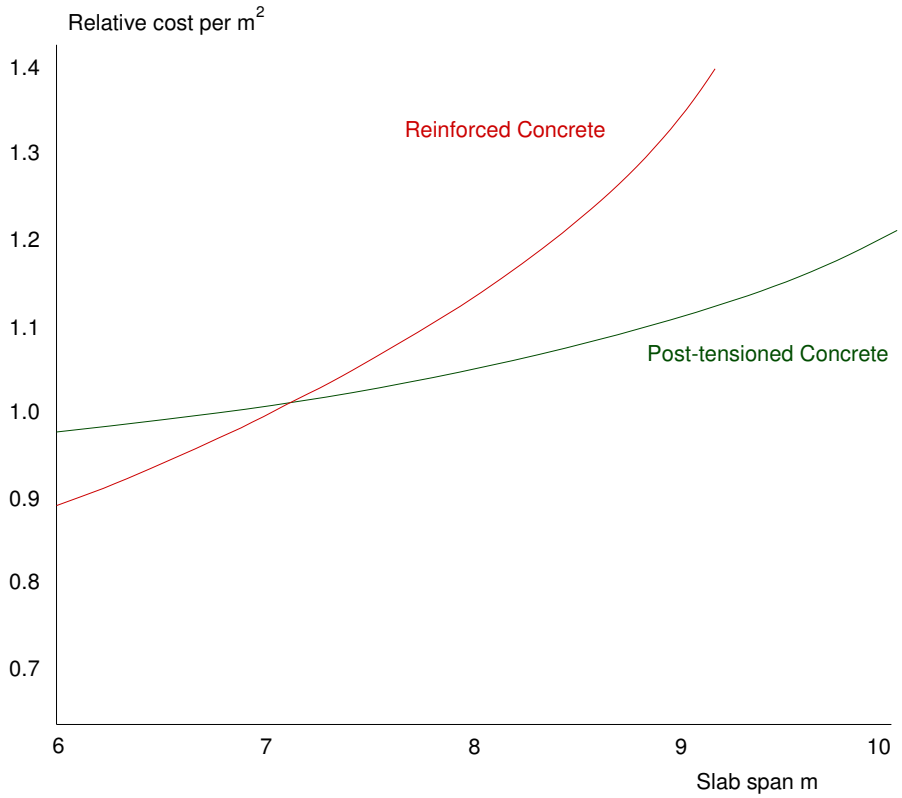
The main advantages of the technology in comparison with alternative designs are:

- Longer clear spans between slab's supports (fewer columns and supports, more free architectural planning);
- Thinner slabs – thickness of slab 1/40 to 1/45 of the span (less concrete is required);
- Minimum necessity of beams (the mushroom slab is used in 8-12m spans);
- Optimization of "passive" reinforcement's (rebar) application;
- Minimal deflection and cracking of the structures;
- Lower overall building height for the same floor-to-floor height;
- Significant reduction in building weight allowing to reduce the foundation load;
- Increased speed of construction as prestressing allows for faster stripping and reuse of formwork;
- Longer building life cycle due to the uncracked nature of the prestressed concrete. It also creates slabs more resistant to water penetration;
- Simpler coordination between consultants due to a flat slab underside, the design and installation of utilities systems is simpler (heating, air conditioning, sprinklers, etc.);
- Long-term deformations due to creep, which are usually significant in concrete slabs, are almost nonexistent in unbonded tendons prestressed slabs.



As you can see in the picture, the post-tensioned slab method allows designers to reduce building heights or to increase free heights between floors.

The financial advantage of post-tensioned concrete in comparison with reinforced concrete can be seen from figure below. Post-tensioned concrete should be considered as a possible economic alternative for most structures when spans exceed 7.0 metres.



Cost comparison. Reinforced vs Post-tensioned concrete slab

The cost of post-tensioning is most sensitive to the following influences: tendon length, tendon arrangement, stressing access, structural scheme, economical design etc.

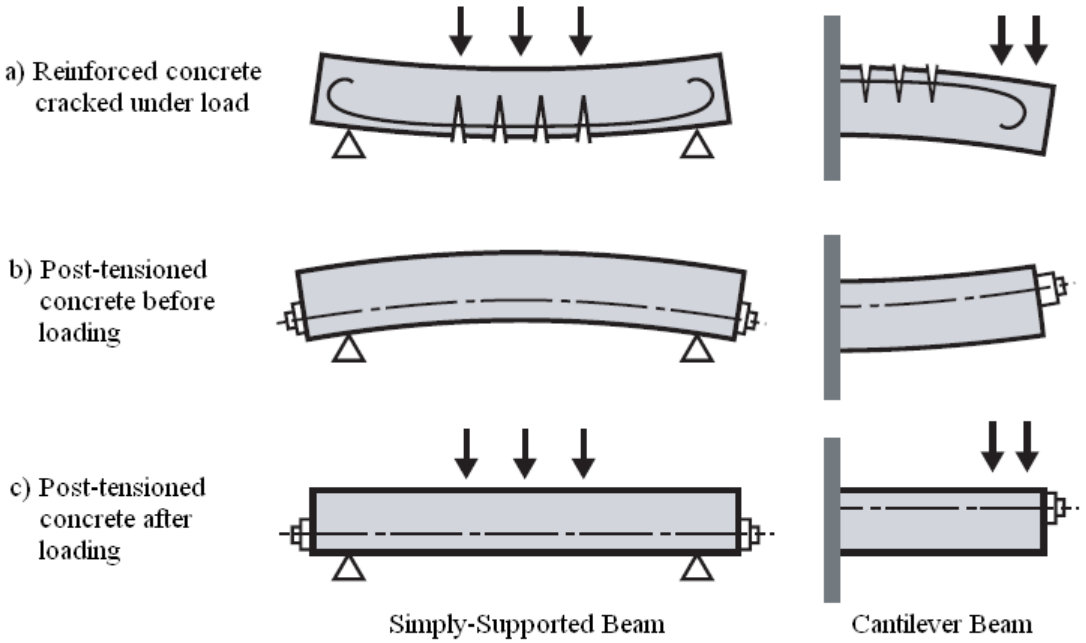
The history of technology

The first application of post-tensioning is believed to have been conceived by Eugene Fressinet in 1933 for the foundation of a marine terminal in France. He is considered to be the founder of the post-tensioned concrete technology as well as one of the major pioneers of prestressed concrete.

The technology was introduced to the USA in 1950. Nowadays in the USA this technology is very popular and widely used.

Technology

Post-tensioning is a technology of producing prestressed concrete. Prestressed concrete is a method for overcoming the concrete's natural weakness in tension. The function of prestressing is to place the concrete structure under compression in those regions where load causes tensile stress. Tension caused by the load will first have to cancel the compression induced by prestressing before it can crack the concrete.

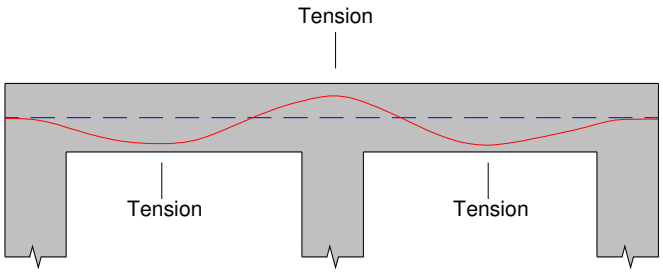


Using the post-tensioning method of prestressing enables a builder to get all the advantages of prestressed concrete while still enabling the freedom to construct the member (slab, wall, column, etc.) on the job site in almost any shape or configuration imaginable.

Post-tensioning is the method of reinforcing (strengthening) concrete with high-strength steel strands using prestress which makes the concrete to compress. Post-tensioning applications include office and apartment buildings, parking structures, slabs on ground, bridges, sports stadiums, rock and soil anchors, and water-tanks.

The Building Company "UBB buve Ltd." mainly uses unbonded post-tensioning systems. The design of structures are made according to LBN (Latvian building normatives), Eurocode, SNiP etc. standards. Strand sizes and technical data conforms to Eurocode requirements.

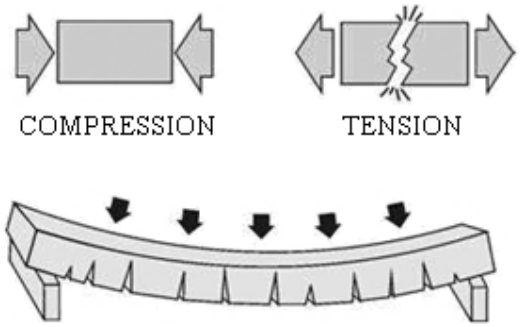
The point of method is that the steel strands are installed in slab between top and bottom layer of non-prestressed reinforcement (rebar). The steel strands are installed in a draped profile instead of running in a straight line – optimum efficiency is obtained by locating the post-tensioned reinforcing in tension zones.



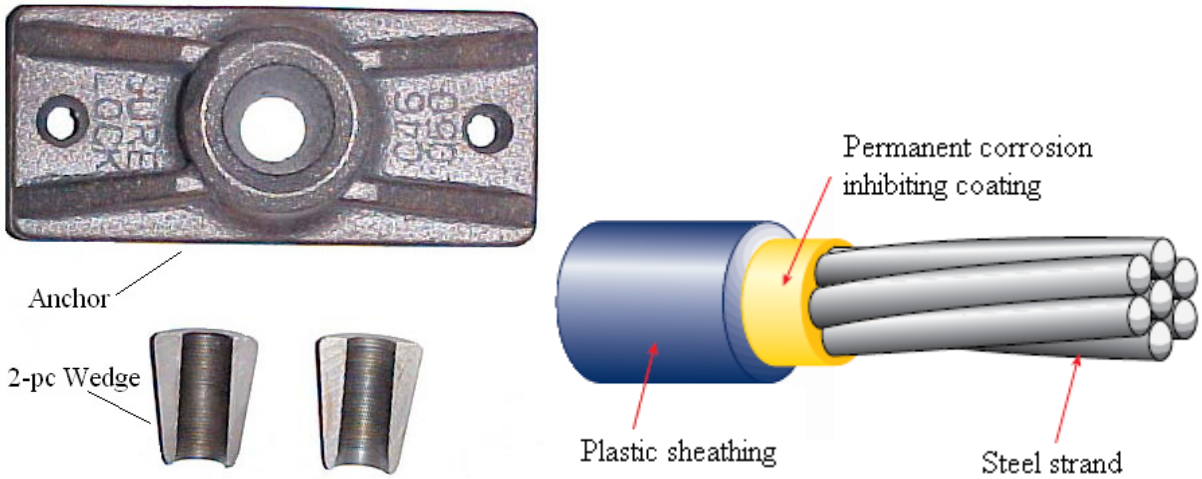
The steel strands are housed in the sheathing or duct to exclude the possibility of bond between the strand and concrete. When the concrete is placed and reached a predetermined strength (usually 70-75% of compressive strength), the steel strands are being tensioned and anchored. Tension is applied to prestressing steel by using a hydraulic stressing jack. The jack bears against one of the anchors (stressing

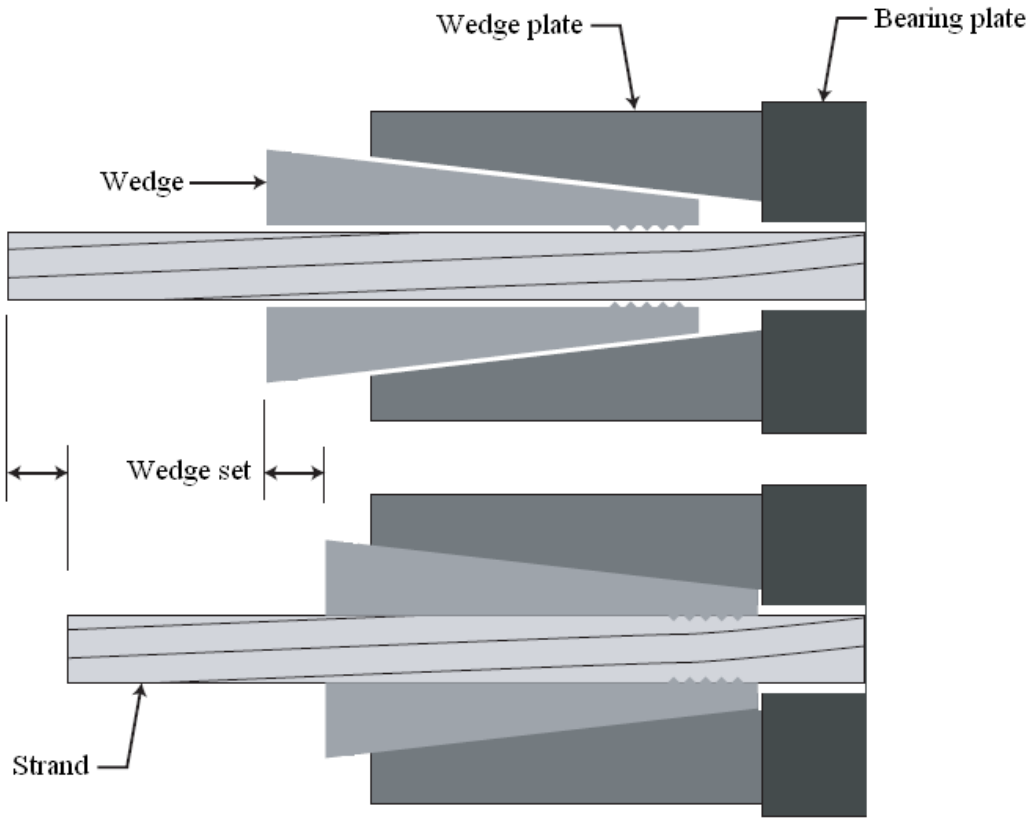
anchor) that is embedded in the concrete and pulls the steel to a predetermined force. Method is based on characteristic features of concrete – it become more stable and strong against collapse by compressing.

As we know, concrete is very strong in compression but weak in tension (the tensile stress of concrete is only about 10% of its compressive strength). In conventional concrete construction when the load is applied to a slab or beam, the beam would tend to deflect or sag. This deflection causes the bottom of the beam to elongate slightly. Even a slight elongation is usually enough to cause cracking. Steel reinforcing bars, that are typically placed in the tension zones to limit the cracks widths and carry out the tensile stress, work as a "passive" reinforcement – they do not carry any force until the concrete has already deflected enough to crack. Post-tensioned concrete's prestressed reinforcement works as "active" reinforcement. The steel is effective as reinforcement even though the concrete may not be cracked. Post-tensioned structures can be designed to minimum deflection and cracking, even under full load.



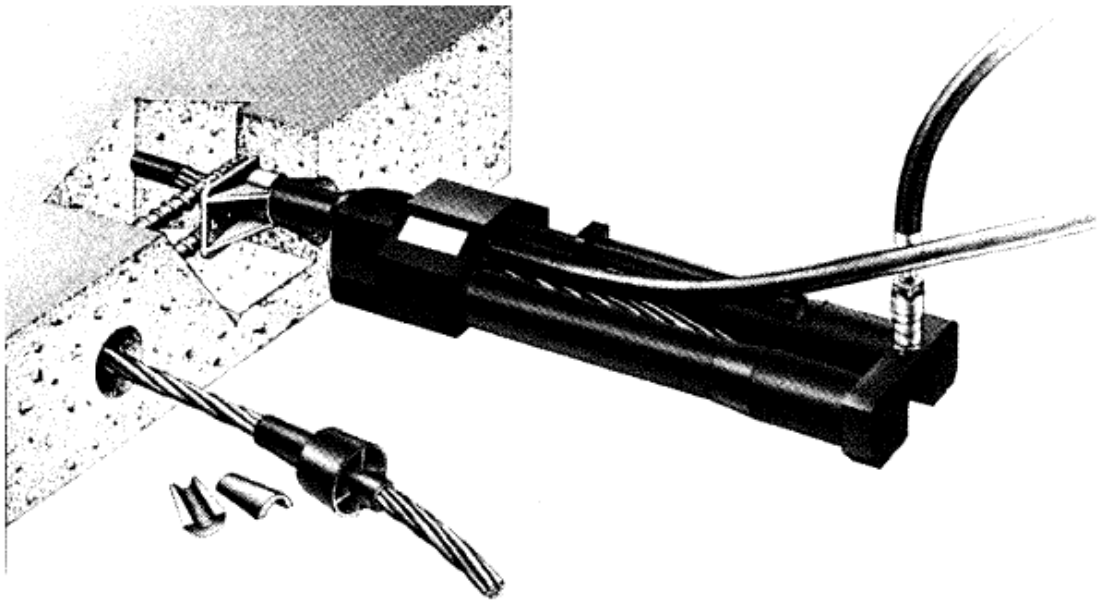
The basic element of a post-tensioning system is called a tendon which consists of the anchorages, the prestressing strand or bar, the sheating or duct and any grout or corrosion-inhibiting coating (grase) surrounding the prestressing steel. There are two main types of post tensioning: unbounded and bonded. An unbounded tendon is one in which the prestressing steel is not actually bonded to the concrete that surrounds it except at the anchorages. The most common unbounded systems are monostrand (single strand) tendons, which are used in slabs and beams for buildings, parking structures and slabs-on-ground. A monostrand tendon consists of a seven-wire strand that is coated with a corrosion-inhibiting grease and encased in an extruded plastic protective sheating. The anchorage consists of an iron casting and a conical, two-piece wedge which grips the strand.



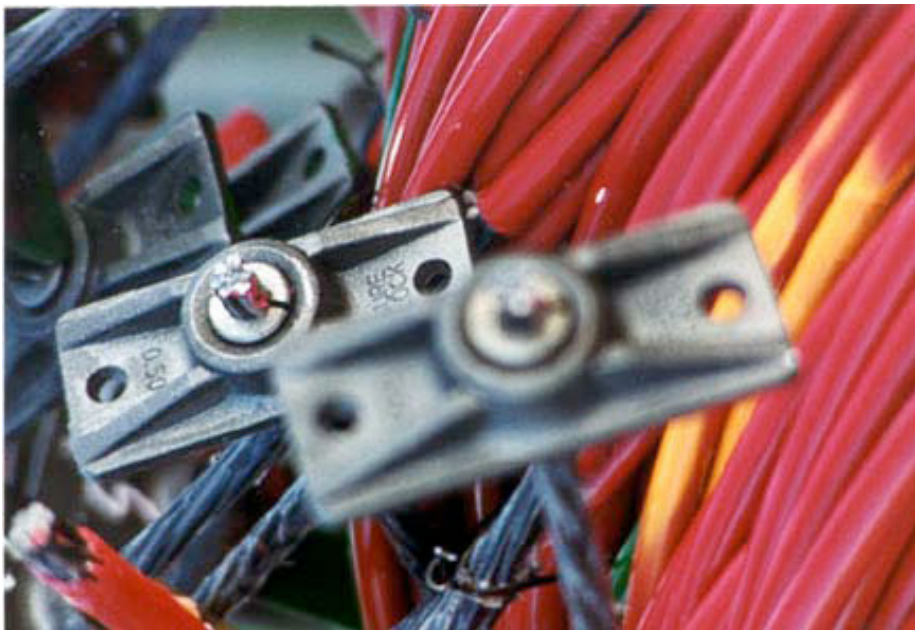


Anchor set or wedge set

A tendon will have anchors on each end to transmit the forces into the structure. One of the anchors fulfills dead-end anchorage functions and the other one fulfills stressing anchorage functions. The stressing anchorage is used for strand stressing but the dead-end anchorage provides anchorage in the other side of tendon. Long tendons may also have intermediate anchors along their length.



Single strands stressing with hydraulic monostrand jack



In bonded systems, two or more strands are inserted into a metal or plastic duct that is embedded in the concrete. The strands are stressed with a large, multi-strand jack and anchored in a common anchorage device. The duct is then filled with a cementitious grout that provides corrosion protection to the strand and bonds the tendon to the concrete surrounding the duct. Bonded systems are more commonly used in bridges and cable-stayed bridges. In buildings, they are typically only used in heavily loaded beams such as transfer girders and landscaped plaza decks where the large number of strands required makes them more economical.

Certificates Received

The Building Company "UBB buve Ltd." has introduced and undergone the following certification:

- Quality Management System according to the requirements of standard ISO 9001:2008;
- Occupational Health and Safety System according to the requirements of the standard OHSAS 18001:2007;
- Environmental Management System according to the requirements of the standard ISO 14001:2004;

Certification covers: Project management, construction works.

CERTIFIED BY inspecta
ISO 9001
ISO 14001
OHSAS 18001

Projects

- Emporium Center, Jelgava (26 000m^2);
  Post-tensioning systems supply and installation.

- Business Center, Duntes street 23a, Riga (15 000 m^2);
  Post-tensioning systems supply and installation.

- Residential Building, Melngaila street 2a, Riga;

- Automobile Showroom SKODA, Kleistu street 31, Riga;

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